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**LANGDON PARK SIXTH FORM**

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| **Subject: Physics** | **Year: Y12** | **Topic: 3.3.2 Refraction, Diffraction and Interference** |

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| ***What and Why*** “why is a fish not really at the position you see it? Why do water waves spread out when disturbed? How do optic fibres work? How are interference patterns formed? These phenomena relate to refraction, diffraction and interference” |

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| **Key terms**  Coherent  Constructive  Critical angle  Destructive  Diffraction  Diffraction grating | Double slit  Endoscope  Frequency  Fringes  Interference  Laser  Line spectra | Material dispersion  Modal dispersion  Monochromatic  Normal  Optic fibre  Path difference  Reflection | Refraction  Refractive index  Single slit  Snell’s law  Spectrometer  Total Internal Reflection  Wavelength |

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| **Specification point** | **Pre-reading** | **Application and Assessment (date)** | **Home learning** | **Extension – Cultural Capital and Reading** |
| **3.3.2.1:** I can calculate path differences and explain interference by a single and double slit  **3.3.2.2:** I can derive and determine each variable. Give examples of the uses of a diffraction grating  **3.3.2.3:** I can define refractive index and explain Snell’s law.  I can explain how optic fibres work and apply the critical angle equation.  I can Show what is material and modal dispersion including by diagram. | Use the Oxford AQA AS textbook p.68 to 87. Look at other textbooks in the library for alternative ideas, explanations and diagrams.  **YouTube Videos:**  (1) Refraction and diffraction in A-level  (2) How optic fibres work  (3) Young’s interference patterns    **Websites:**  <https://isaacphysics.org/concepts/cp_diffraction>  <http://alevelphysics.org.uk/optics.html>  <https://www.physicsclassroom.com/class/light/Lesson-3/Young-s-Experiment> | **Practicals:**  (1) Required Practical 2:  Investigation of interference effects to include the Young’s slit experiment and interference by a diffraction grating.  (2) Determine the refractive index of glass using a semi-circular block  (3) Determine angle of order using a spectrometer and diffraction grating  **Assessment**:  Minitest Waves (II) (1st week Nov)  Multiple choice test on Waves (2nd week Nov) | (1) Research how the medical endoscope works  (2) Investigate how a diffraction grating is used to determine the Sun’s composition  (3) From experimental data verify the wavelength of the Red Ruby Laser in the lab  Make notes on each topic and complete the exam style practice questions | (1) Visit the Science Museum  and make notes on  diffraction and interference  **Reading:**  **What Is Light?**  **(ScienceBasics)**  **by**[**Weakland, Mark**](https://www.amazon.co.uk/s/ref=rdr_ext_aut?_encoding=UTF8&index=books&field-author=Weakland,%20Mark) |

**Pre-assessment content review**

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| I feel secure in | I need to focus on | My action plan |

**Pre-assessment skills review**

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| I feel secure in | I need to focus on | My action plan |

**Post-assessment review**

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| Weaknesses in content knowledge | Skills I need to focus on | My action plan |
| Retest / review – teacher and student comment | | |

**Revision planning**

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| Spec point | Notes complete | Revision materials | Past paper Qs | Timed conditions |
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